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ABSTRACT

A theoretical basis for defining and measuring the quality of institutions of higher education, namely for accreditation purposes, is developed. The theory, the Attributive Theory of Quality, is illustrated using a calculation model that is based on general systems theory. The theory postulates that quality only exists in relation to the phenomenon to which it is attributed. Quality can be defined by its attributes and can be quantified by developing a system of numeric values for the attributes. An intersubjective approach to data collection and analysis requiring participation by experts is recommended. To illustrate how the theory can be operationalized, a model was developed using Lotus 1-2-3 and tested with data from an evaluation of five community college libraries. Results were verified against similar data from a panel of five library experts. The study illustrates the reliability of the method. Further research to test the model is recommended. A 154-item list of references is included. Two tables present data from the illustrative study. (SLD)

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THE ATTRIBUTIVE THEORY OF QUALITY: A MODEL FOR QUALITY MEASUREMENT IN HIGHER EDUCATION

By

ARASH AFSHAR

INSTITUTE OF HIGHER EDUCATION
University of Florida

February 1991

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THE ATTRIBUTIVE THEORY OF QUALITY: A MODEL FOR QUALITY MEASUREMENT IN HIGHER EDUCATION

By

ARASH AFSHAR

A DISSERTATION PRESENTED TO THE GRADUATE SCHOOL
OF THE UNIVERSITY OF FLORIDA
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1990

Foreword

In the current multiple attempts to define quality, few researchers have been able to produce a useful methodology for a definition that would be accepted by more than a limited number of professional people. In an attempt to assist in solving this problem, Dr. Arash Afshar has evolved a new theory: quality can be defined by its attributes and can be quantified by developing a system of numeric values for those attributes. In other words, one should be able to provide a value for quality that is based upon numeric values assigned to selected attributes.

He illustrates this theory by providing a model that examines a community college library and tests his theory through applications by experts relating to evaluation of a community college library. He has enabled the accreditor to use a LOTUS 1-2-3 program, developed by him, to implement this measurement of quality in the community college library. We trust that this interesting theory will challenge our colleagues to test its value, application and usefulness. We would be willing to assist such persons in every way we can. For example, disks with the Lotus program are available to interested persons.

The Institute of Higher Education is pleased to present this monograph to those who are concerned with the evaluation and/or accreditation of institutions of higher education.

James L. Wattenbarger
Distinguished Service Professor
Director, Institute of Higher Education
University of Florida

February, 1991

TABLE OF CONTENTS

CHAPTERS		Page
I	INTRODUCTION	1
	Statement of Purpose	6
	Assumptions	7
	Definition of Terms	8
	Theories and Model	9
	Significance	12
	Organization of the Study	15
II	ATTRIBUTIVE THEORY OF QUALITY: INTRODUCTION AND EVALUATION.	16
	Definitions and Types	17
	Theory Formalization	19
	Criteria for Evaluation of Theory	20
III	REVIEW OF THE RELATED LITERATURE	
	Introduction	22
	Quality and Quality Measurement	24
	Accreditation	35
	General Systems Theory	42
	Objectivity, Subjectivity, & Intersubjectivity	47
IV	RESEARCH METHODOLOGY	
	Introduction	52
	Research Perspective	54
	Research Population	55
	Selection of Samples	55
	Selection of the Panel	55
	Instrument	55
	Data Collection	56
	The Illustration Model	56
	Calculation of Data	56
V	DATA ANALYSIS AND FINDINGS	58
	Tables 1 & 2	59
VI	CONCLUSIONS AND RECOMMENDATIONS	61
	Recommendations for Further Research	63
	Limitations of the Study	63
	REFERENCES	66

CHAPTER I
INTRODUCTION

> There is nothing more difficult to take in hand, more perilous to conduct, or more uncertain in its success, than to take the lead in the introduction of a new order of things.
>
> Niccolo Machiavelli (1513)
> (In Young, 1983, p. 1)

Along with the other sectors of the society, American higher education has been significantly affected by the intense socio-economic changes of the 1980s. Resources are dwindling, and the competition by business and industry in providing higher education to the work force is increasing (Bok, 1986; Cross, 1987). State boards of higher education, made stronger in the 1970s, have moved into areas such as curriculum quality control, and all three branches of the federal government have found ways and the means of imposing their views on the institutions (Stauffer, 1981).

These changes have resulted in increasing public demand for accountability from institutions of higher education, which in turn has, once more, focused attention on "quality" which traditionally has been the primary touchstone of education. Astin (1985a), Astin and Solmon (1981), Bowen (1974), COPA (1986), Finn (1980), Freedman (1987), Rathburn (1982), and others have acknowledged that

quality and its related issues will be the primary and enduring concern and preoccupation of educators and the public alike. More than any other factor, academic quality will determine "not simply the prosperity of the institutions, but how important a role colleges and universities will play in American life through the end of this century" (Stauffer, 1981, p. 5). Quality measurement will change from an institutional concern to a national priority (Ashworth, 1979). A proliferation of evaluation activities in higher education focusing on maintenance and improvement of quality (Craven, 1980) and appeals for further involvement of accreditation bodies (COPA, 1986) are clear evidence of this trend. These efforts, however, have not been fruitful.

Although the term quality is one of the most exhaustively used terms of everyday life, it has not yet been accurately or acceptably defined, measured, or tested (Astin, 1985a). Attempts to capture the concept of quality have resulted in a wide range of interpretations, from philosophical discourses to operational definitions. Lawrence and Green (1980) stated that in most cases the result of these labors has been an agreement that quality is a "subjective" judgement by an individual based on some supporting evidence. Rathburn (1982) maintained that "researchers in higher education have noticeably refrained from providing a constitutive definition of educational

quality but have, through research design and choice of various evaluative criteria, operationally defined the concept" (p. 2).

A common method of defining and measuring the quality of the institutions of higher education, dating back to the early twentieth century, has been institutional ranking, which according to Solmon (1981) has developed from the "American interest in excellence per se and in competition" (p. 8). Since 1910, over one hundred such attempts, employing a wide range of criteria and indicators, have been recorded among which studies by Astin (1965a), Cartter (1966), Cattell (1910), Knapp and Goodrich (1952), Roose and Anderson (1970) can be mentioned. However, according to Astin (1985), traditional concepts of "excellence" used in these studies--reputational, resources, outcome, and content approaches--have not been conclusive and have suffered major drawbacks. Gourman's ranking and evaluation reports of American colleges and universities, although widely accepted, did not have any discernable logical or scientific foundation (Coughlin, 1978; Webster, 1984). Even the most recent scheme of ranking "America's Best Colleges" by the U.S. News & World Report magazine conducted by Sheler, Toch, Morse, Heupler, and Linnon (1989) overlooks other major institutional components. The 1990 ranking of America's graduate schools by the same publication suffers from similar inadequacies ("America's Best," 1990).

These and other limited views of quality have had serious adverse effects on higher education ranging from unrealistic rating of different types of institutions (Bowen, 1974; Lawrence & Green, 1980) to problems with articulation and distribution of resources (funds) among institutions. According to Astin (1985a), these traditional beliefs are detrimental to the educational system as a whole (p. ix). Attempts to develop alternative assessment criteria are also numerous, ranging from earlier post-traditional views reported by Rathburn (1982) to Astin's (1985) "talent development approach." Despite these sincere efforts, without an explicit and agreed-upon definition of quality to serve as the basis for a measurement instrument, advances toward solving this problem cannot be made.

Currently, the most intensive quality measurement and control activities are undertaken by accrediting agencies. Along with the local lay boards of education, accreditation has been one of the two unique features of the American educational machinery (Armstrong, 1962; Crippen, 1981; Selden, 1960). According to Brubacher and Rudy (1968), accrediting processes were initiated by leaders in education in response to a need for articulation between and quality control of diverse educational organizations that have developed in this country (Crippen, 1981).

The importance of accreditation and accrediting agencies is reflected in the history and growth of these

institutions. The American pattern of accreditation, with the specific purpose of improving quality standards, emerged in 1906 (Stauffer, 1981; Young et al. 1983). The first accrediting activity occurred in 1910, and the first list of regionally accredited institutions was published by the North Central Association in 1913 (Crippen, 1981; Orlans, 1975; Selden, 1960). Today, six regional and more than 70 program accrediting agencies, and a number of state and federal agencies in the public sector (Crippen, 1981; Kaplin & Hunter, 1966) are involved with identifying and determining academic quality and encouraging institutions to maintain and enhance academic quality (Crippen, 1981).

The process of accreditation has been defined operationally in a number of ways. According to Orlans (1975), the basis of any accreditation activity must be the development of standards against which the features of a program can be compared. However, agreement upon a set of standards may be a controversial matter. The standards should reflect the consensus of the leading institutions or programs in a professional field and must be reviewed periodically with the thought in mind that changes may need to be made (Crippen, 1981). Bertrand (1974) maintained that accreditation was the process of comparing characteristics of an institution with a previously agreed-upon and approved "set of standards that provide a level of educational quality or competence. . . " (Adcox, 1983, p. 1).

The criteria for accreditation reflected in the Standards Handbooks of the six regional accrediting agencies demonstrated disparity among the definitions, criteria, standards, and foci of emphasis, verifying the shortcomings identified by Selden (1960), namely, (a) an inability to evaluate quality in education, and (b) the failure to determine the relative emphasis that should be placed on different features of the evaluative process (Adcox, 1983).

A review of the existing literature revealed the root of the problem to be the common misconception that "quality" is an independently existing phenomenon, such as mass or volume, and that the concept known and referred to as quality exists in isolation. This belief has resulted in the formation of an inadequate theoretical basis that, in turn, has resulted in a number of inconclusive definitions of quality. Naturally, as with any ill-conceived and poorly defined phenomenon, the attempts to measure quality have proven to be futile, leading to the current state of confusion and uncertainty. A fresh systematic approach, therefore, is needed to settle the controversies over the concept, definition, and measurement of quality.

Statement of Purpose

The purpose of this study was to develop and advance a theoretical basis for defining and, subsequently, measuring quality, especially as it related to evaluation of higher education institutions for such purposes as accreditation.

This theory, called the Attributive Theory of Quality, (introduced and evaluated in Chapter II) is advanced by the author to this end. To illustrate the operationalized theory, a calculation model based on the general systems theory (described in Chapter IV) supplements the study.

Assumptions

1. The numeric value generated by the model is the indicator of quality in any given system.
2. The purpose of the proposed model is to illustrate the operationalization of the Attributive Theory of Quality. In this context, the values and weights (numbers reflecting the condition and importance factor of components of a system, e.g., an institution) can be assigned intersubjectively by knowledgeable experts working at the institutions based on their perceptions of the value and importance of each component to the mission of the institution.
3. The arithmetic mean represents the intersubjectively drawn consensus figure.
4. High and low values represent the strong and weak components of the system respectively.
5. Comparison of phenomena can be carried out by assigning relative numerical values to them.
6. "Numerical terms express some of the most abstract ideas which the human mind is capable of forming" (Struik, 1967, p. 8).

Definition of Terms

Before further discussion of the theory and the model, a number of definitions are necessary to clarify the theoretical and application concepts of the study:

Attributes are properties of phenomena, objects, etc. (Hall & Fagen, 1968, p. 81). An attribute has its existence in a phenomenon, and does not exist in and of itself, e.g., weight of an object (Adler, 1978, p. 12).

Attributive means "of or having the nature of an attribution or attribute" (American Heritage. . . 1981).

Components are the smallest meaningful units that interact with each other to fulfill the purpose(s) of the system (Silver, 1983, p. 51); e.g., print equipment or card catalogs in a library.

Condition is the degree to which a property is present in a component, e.g., number of books supporting a particular program or the number of hours a library is open.

Phenomenon is any tangible or intangible (material or abstract) object, process, or product; anything that exists.

Subsystem is a system within the larger system. It is a set of components interrelating (within a boundary) for a purpose that relates to the purpose(s) of the larger system (Silver, 1983, p. 55). A library is a subsystem of an institution and an off-campus site is a subsystem of a library.

System is an integrated assembly of interacting elements designed to carry out cooperatively a predetermined

function (Flagle, 1960); a set of objects together with relationships between the objects and between their attributes (Hall & Fagen, 1968). In this study, an institution of higher education is considered as a system (consisting of a number of subsystems and components).

Track (In the graphic depiction of system as a hierarchy) is the path of a component to the system (at the top) through subsystems.

Value indicates the condition of a component or the degree to which the property or characteristic comprising a component is present. This value, numeric variable between 0.0 (absence of the property) and 100 (property at optimal level), can be assigned intersubjectively by experts.

Weight is the contribution factor (the worth or importance) of a subsystem (in percentage figure) to its immediate system at the next level of hierarchy which in turn can be a subsystem of another system, e.g., the importance of the staff subsystem to library as compared with the institutional relationship or services subsystems. The concept of weight in the context of this study is used differently from the ones used in other areas.

Theories and Model

According to Adler (1978), distinguishing between a phenomenon and its attributes dates back to the time of Aristotle who divided the physical world into bodies and attributes. An attribute belongs to a body and has its

existence in it, but not in and of itself. Attributes of phenomena, unlike phenomena themselves, are not changeable, though they represent the changes in the phenomena. In other words, a change in an attribute, such as quality, is only possible by changes in the phenomenon to which it belongs. In addition to the basic physical attributes, a phenomenon has other attributes including its "relationships with other things, the actions it performs, the results of its being acted on, the time of its coming into existence, the duration of its existence, and the time of its ceasing to exist" (p. 14).

The proposed Attributive Theory of Quality (further discussed in Chapter II) provides the theoretical basis for understanding the concept and formulating a conclusive definition for quality, especially as it relates to the evaluation of higher education institutions. This theory postulates that quality does not exist as an independent entity or phenomenon; that is, it cannot be perceived in isolation; rather, it only exists in relation to the phenomenon to which it is attributed. Similar to attributes such as weight or size, quality is only identifiable when it is considered in relation to an object. As such, it can be defined and measured as the interactive sum of all the necessary and sufficient properties that comprise the phenomenon. Specifically, to determine the presence and measure the degree, or the quantity, of quality of any

phenomenon, the components of the phenomenon must be identified; and then, the values and weights of the components and subsystems must be established so that the interactive sum of all the subsystems can be obtained to indicate the quality of the system. Since the Attributive Theory of Quality views any phenomenon is a system, the general systems theory is used as the theoretical/ methodological basis for constructing a measurement model which will illustrate the operationalization of the proposed theory. According to Kimbrough and Nunnery (1983), systems approach as an "empirical and interdisciplinary methodology" (p. 320) can be used to place an abstract concept and entity into a practical framework.

Although such a model can satisfy the requirements of both theories, the dispute over the objectivity or subjectivity of the data and results will be present and must be resolved. Quality has generally been perceived as a subjective judgment by an individual (Lawrence & Green, 1980), and "objective" measurement of "subjectivity" has long been a source of dispute. Extensive literature on subjectivity and objectivity has been generated by the philosophers and philosophers of science from as far back as Socrates, Plato, and Aristotle (Feyerbend, 1981).

Emphasis on objectivity gained strength in the early decades of the twentieth century and dominated science in general, and the evaluation and measurement in education and

other social sciences in particular. This status, however, has been seriously questioned during the past two decades, and has shifted the focus of attention to intersubjectivity, advocated by the philosophers of science (D'Espagnat, 1983). For research in education as a social science, the intersubjective approach has more applicability than other commonly used methods (Dallmayr, 1981). This study, therefore, adopts an intersubjective approach to data collection and analysis, which in turn necessitates adopting a qualitative research methodology.

Significance

As its principal contribution, this study presents the Attributive Theory of Quality that provides a solid conceptual and operational basis for defining quality as attributed to higher education. Further, by utilizing the systems theory, it adds a secondary contribution in form of a quality measurement model. The theoretical and methodological bases of the study clarify the confusion that has prevailed around this concept. According to the Attributive Theory of Quality, quality as an attribute not an independent entity, and is defined as the interactive sum of all the necessary and sufficient properties that comprise a phenomenon, thus ending the futile labor of those who try to define a non-entity. This concept of quality is then placed in the context of the general systems theory to make its quantitative measurement possible.

The postulates of the proposed theory settle some of the most important disputes over the concept of quality as it relates to education in general and higher education in particular. First, by asserting that the quality of a phenomenon is the interactive sum of all of its "necessary and sufficient" properties of that phenomenon, e.g., all of the components needed for an institution to fulfill its missions; it establishes that the quality of each phenomenon should be (a) measured only in relation to itself, and (b) only based on the elements/factors that are directly contribute to the fulfillment of its mission. As such, the proposed theory puts to rest such unsuccessful "quality indicator" concepts as reputational (based on comparison), and resources, outcome, and content (based on single components). Also, since the evaluation of the institutions will be based on the necessary and sufficient properties, excessive resources which do not serve the educational goals of the institution (financial investments, for example) will be excluded from consideration. Additionally, the proposed theory limits the comparison between institutions to those belonging to the same class (community colleges vis-a-vis four-year universities vis-a-vis research universities), limiting the inequities in resource distribution caused by fallacious comparisons of the non-comparables.

This systematic approach to evaluation also drastically improves the effectiveness of accreditation processes and

practices. The application of the system theory requires the identification of all the subsystems and components of an entity and precludes the omission of any part, however insignificant, from the evaluation process, thus ensuring the comprehensiveness of the assessments and self-studies. Moreover, by including both the weight (the importance/ contribution factor) and the value (indicator of the condition) of the component, this approach provides a more accurate account of the real value of each component, while demonstrating the strong and weak points of a system as they affect its overall quality. Decision-makers can evaluate factors such as cost, manpower, implementation time, etc., against the relative weight of each subsystem to determine its overall effect on the system. With this information, they can identify the improvement actions which will result in a higher yield in the overall quality of the system and allocate their resources accordingly.

This study also provides several major leads for further investigation and, consequently, adds considerably to the existing body of research. Classifying the institutions and identifying their subsystems, defining the parameters and methodologies for assigning weights and values, and methods of evaluating decisions are some of the areas of research, the results of which can contribute vastly to the current body of knowledge. Finally, faced with the persistent anomalies of the past and absence of any

discernable paradigm (Kuhn, 1973), this study provides the first such paradigm.

Organization of the Study

This study is organized in six chapters. Following the Introduction, Chapter II is fully allocated to the introduction and evaluation of the Attributive Theory of Quality. Chapter III, the review of the related literature covers the literature on quality and quality measurement, accreditation, systems theory and systems approach, and objectivity, subjectivity and intersubjectivity. In Chapter IV, the methodology, data collection and analysis, and the model for illustrating the operationalization of the Attributive Theory of Quality are presented. Chapter V presents the findings, and Chapter VI contains a summary, the conclusion, and the recommendations for further studies. Practical implications for the agencies and individuals involved in evaluative processes are also addressed here.

CHAPTER II
THE ATTRIBUTIVE THEORY OF QUALITY: INTRODUCTION & EVALUATION

> We must begin with the mistake and find out the truth in it.
> That is, we must uncover the source of the error; otherwise hearing what is true won't help us.
> It cannot penetrate when something is taking its place.
>
> Wittgenstein
> (Nersessian, 1984, p. 1)

"There is nothing more practical than a good theory."
(Kerlinger, 1964, p. 12)

Theories are generated to "impose order on naturally unordered experiences by providing systematic ways of viewing a basically chaotic world" (Fawcett & Downs, 1986, p. 2) and to assist in understanding, explaining, predicting, and controlling natural events (Kerlinger, 1964). In simple terms, through theories people seek to depict the what, why, and how of a phenomenon. A theory is, therefore, an abstract representation of reality as we perceive it.

The Attributive Theory of Quality was formulated as a response to the prevailing state of confusion over the concept of quality and quality measurement. A review of the related literature (Chapter III) revealed the absence of any solid theoretical bases or any constitutive or operational definitions for quality. The author's contention is that

the lack of a theoretical framework has been the primary cause of chaos since concepts, definitions, propositions, and abstractions are embedded in theories.

The Attributive Theory of Quality has the potential to provide a solid theoretical basis for formulating a conclusive definition for quality. This theory postulates that quality does not exist as an independent entity or concept, that is, perceived in isolation. Rather, it only exists in relation to the phenomenon to which it is attributed and as such, can be defined and measured as the interactive (composite) sum of all the necessary and sufficient properties that comprise the phenomenon. At this stage, an evaluation of this theory based on the criteria represented in the literature is deemed necessary. First, however, a review of theory in general seems appropriate.

Definitions and Types

Definitions of theory are numerous, recurrent, and varied in the current literature on theory and research. Kerlinger defined theory as a

> a set of interrelated constructs (concepts), definitions, and propositions that present a systematic view of phenomena by specifying relations among variables, with the purpose of explaining and predicting the phenomena . . . . If by using the theory we are able to predict successfully, then the theory is confirmed and this is enough. (Kerlinger, 1964, p. 11)

As stated, the proposed theory was formulated after extensive research in literature failed to produce a solid theoretical framework for definition and measurement of

quality. The search in literature was essential, because theory and research are the two components of the scientific process. Brown (1977) considered their relationship a dialectic, a transaction whereby theory determines what data are needed and research results provide challenges to accepted theories.

Fawcett and Downs (1986) classified theories and their related research activities into three categories, (a) descriptive theory (with descriptive research), which describe or classify specific dimensions or characteristics of a phenomenon; (b) explanatory theory (with correlational research), which specifies relations between dimensions or characteristics of a phenomenon by explaining how the parts of a phenomenon are related to one another; and (c) predictive theory (with experimental research), which addresses the causation or the "why" of change in a phenomenon, and seeks to predict the precise relationships between dimensions or characteristics of a phenomenon or differences between groups.

As a descriptive theory, the Attributive Theory of Quality can be further strengthened through exploratory research that might reveal the need for further expansion of the theory to explanatory and eventually predictive types. Two other aspects, i.e., theory formalization and evaluation, should be addressed in relation to the proposed theory. However, in order to avoid redundancy, a point-to-

point reference to the Attributive Theory of Quality will not be made. Instead, the rest of this section should be viewed with the Attributive Theory of Quality in mind. An evaluation checklist will conclude this section.

Theory Formalization

Briefly stated, theories are made up of one or more concepts, the definitions of those concepts, and the propositions that state something about the concepts. Theory formalization is used to understand a theory and to extract an explicit statement and a diagram of a theory from its verbal explanation. The first step in theory formalization is the identification of its major concepts. Fawcett and Downs (1986) defined a concept as the description of an abstract idea or mental image of some phenomenon. They added that a concept summarized the related observations and experiences and referred to the properties of a phenomenon, not to the phenomenon itself.

The second step in theory formalization, according to Fawcett and Downs (1986), is the identification of the definitions of the concepts used in theory. As the basic building blocks of theories, concepts must be precisely and accurately defined so that the meaning of one concept may be distinguished from the meaning of another. To make the concepts of a theory empirically testable, two types of definitions, namely, constitutive definitions and operational definitions are needed.

Specifying relational or nonrelational propositions is the third step in theory formalization. A proposition is a declarative statement about a concept or the relation between concepts. Relational propositions link two or more concepts by stating that changes in one variable is systematically accompanied by changes in another variable. Nonrelational propositions either state the existence of a concept or define it. The former assert the existence or level of existence of a phenomenon, and the latter describe its characteristics. Finally, the fourth step in theory formalization is the hierarchical ordering of the propositions according to their levels of abstraction, on a continuum from abstract to concrete or from concrete to abstract (Fawcett & Downs, 1986).

Construction of a diagram of the theory is the final step in theory formalization. A diagram helps to determine how all concepts, definitions, and propositions of the theory were brought together. It is the final aid to understanding exactly what the theory says and what it does not say. It also facilitates the identification of gaps and overlapping ideas in the theory (Fawcett & Downs, 1986).

Criteria for Evaluation of Theory

Criteria for the evaluation of theory can be found in the literature of almost every discipline. The current literature reflected an overall agreement on four criteria for evaluation of a theory. These criteria, as presented by

Fawcett & Downs (1983), included significance, internal consistency, parsimony, and testability. Significance requires that the theory address a phenomena of interest to a discipline, as well as providing both precision in prediction and explanatory power (Fawcett & Downs, 1986). Internal consistency requires concepts to reflect semantic clarity and consistency. Semantic clarity and consistency are related in such a way that one without the other is useless (Chinn & Jacobs, 1983). Parsimony requires a theory to use as few concepts, definitions, and propositions as possible to describe, explain, or predict a phenomenon. False parsimony occurs because of oversimplification of the phenomenon or when the theory does not capture the essential features of a phenomenon (Fawcett & Downs, 1986). Finally, testability is the basic requisite of a useful theory. According to Marx (1976), if "there is no way of testing a theory, it is scientifically worthless, no matter how plausible, imaginative, or innovative it may be" (p. 249).

CHAPTER III
REVIEW OF RELATED LITERATURE

"It is a capital mistake to theorize before one has data."
Sir Arthur Conan Doyle 1859-1930
The Adventures of Sherlock Holmes

Introduction

An extensive systematic search for literature in three general but distinct areas, (a) quality and evaluation, (b) accreditation, and (c) the general systems and decision theories was conducted. Later, another literature search on objectivity, subjectivity and intersubjectivity in philosophy, science, and research was conducted.

The review of the gleaned materials demonstrated the need for substantial refinement and narrowing of the titles in the first two areas. The outcome was a considerable amount of literature that dealt more specifically with accreditation, assessment and evaluation as related to quality and quality measurement. Also, included in this category was literature on institutional rankings as earlier forms of quality indicators. The literature on accreditation was equally inconclusive in relation to the questions of quality and quality measurement. Most of the material covered the history and processes of accreditation (Armstrong, 1962; Orlans, 1975; Selden, 1960; etc.), and

even the review of the Handbooks of the Accreditation published by the six regional accreditation agencies (MSACS, 1982; NCACS, 1988; NEASC, 1983; NWASC, 1988; SACS, 1988; WASC, 1988) had no acceptable definitions for quality, although the term, along with its perceived synonyms such as excellence and effectiveness, was repeatedly used.

The literature on the general systems theory and its applications was available, but the search for materials dealing with the decision theory and decision tree analysis resulted in identifying a few journal articles. Five of these articles provided some basic information on the subject, and were initially deemed relevant to this study. Later, however, they were proven inappropriate, and were consequently omitted.

Subjectivity and objectivity in perception and measurement and the debates between the proponents of each were recurrent themes in the literature. The review of this literature presented relatively new approach to perception and measurement of such concepts as quality, namely, the intersubjective approach (Brown, 1977; Dallmayr, 1981; d'Espagnat, 1983; Firestone, 1988; etc.). This approach has proven to be more appropriate for this study and was, therefore, adopted as the research methodology.

The main body of the review will, therefore, include three parts: quality and quality measurement (including rankings and accreditation); the general systems theory;

and, finally, objectivity, subjectivity, and intersubjectivity. The review of the literature related to theory construction and testing has been presented in chapter II.

Quality and Quality Measurement

Attempts to capture the ubiquitous and elusive concept of quality have resulted in a wide range of interpretations from philosophical discourses to operational definitions. The outcome of these efforts has been a consensus that quality is a subjective concept that does not lend itself to accurate definition or measurement.

Juran (1988) stated that the word quality has multiple meanings, and that two of those meanings dominate the use of the word, "(a) quality consists of those product features which meet the needs of customers and thereby provide product satisfaction, and (b) quality consists of freedom from deficiencies" (p. 2.2). Cartter (1966) defined it as "someone's subjective assessment" (p. 4), and Roose and Anderson (1970) labelled it as "an amorphous attribute" (p. xi). Measuring quality has been equally difficult, because "there are no agreed-upon, defined standards for measurement" (Stauffer, 1981, p. 2).

To illustrate the prevalent frustration and confusion over the concept, definition, and measurement of quality the following outcry by Pirsig (1975) is often quoted,

> quality . . . you know what it is, yet you don't know what it is. But that's self-contradictory. But some things are better than others, that is, they have more quality. But when you try to say what the quality is,

> apart from the things that have it, it all goes poof! There's nothing to talk about. . . . Obviously some things are better than others. . . but what's the 'betterness'. . . So round and round you go, spinning mental wheels and nowhere finding anyplace to get traction. What the hell is Quality? (p. 184)

Quality measurement and improvement have been among the most enduring issues in higher education. According to Solmon (1981), the implications of quality in higher education have been excellence, accomplishment, and being distinguished; the other extreme in the assessment of institutional or program quality seems to have developed from the "American interest in excellence per se and in competition" (p. 6).

Institutional ranking and accreditation have been the two most common methods of defining and measuring the quality of the institutions of higher education in America. Ranking, particularly reputational ranking, has received widespread acceptance through decades. Since 1910, over one hundred such attempts employing a wide range of criteria and indicators have been recorded. Most have dealt with graduate programs and only a few address the undergraduate schools. Several reviews and critiques of these studies have been conducted (Dolan, 1976; Lawrence & Green, 1980; Webster, 1981; Rathburn, 1982; etc.). Therefore, to avoid needless repetition, this part of the review will first give a brief chronological account of the most notable of these rankings, and then will present an overall critique of the ranking schemes and their criteria and indicators.

Institutional Ranking

In 1910, James McKeen Cattell devised the first academic quality ranking (Webster, 1986a). In the same year, Abraham Flexner's report, "Medical Education in the United States and Canada" forced the low quality [smaller?] medical schools out of business (Stauffer, 1981). More than a decade later, in 1924, Hughes conducted the first studies for the Association of American Colleges, created in 1900, in response to the need to certify to European universities which American institutions educated students at quality levels meriting admission to their doctoral programs. Based on this study, Hughes published the first reputational ranking of graduate programs in 1925. He replicated this study for the American Council on Education (ACE) in 1934 (Stauffer, 1981). These two studies remained in force for almost two decades until Knapp and Goodrich (1952) published a controversial report showing that few of the nation's most highly regarded universities excelled in producing male scientists, arguing that the reason some excelled in the production of scientists was that they had excellent faculty members and curricula in science.

The next major study was conducted by Hayward Keniston as a part of an educational survey of the University of Pennsylvania based on the quality of doctoral programs and the faculty (Rathburn, 1982). Lists of the top 20 or so departments in the 24 disciplines were published in 1959 as

an appendix to a study of graduate education at the University of Pennsylvania (Roose & Anderson, 1970, p. 1), and was used to create the list of the top 20 institutions.

In the same year, Chesly Manly published the first ranking of undergraduate colleges for the Chicago Tribune. The basis of the ranking was the reputation of the institutions among the higher education experts and objective data when there was no clearly defined consensus among his experts (Webster, 1986b). Lazarsfeld and Thielens, Jr. (1958) grouped the 165 institutions at which the social scientists they studied were employed into eight levels of quality (although they did not publish the list of which schools fell into which group). They used the number of library volumes as the criterion.

During the 1960s and early 1970s, the rating game gained momentum. In 1960, Ousiew & Castetter correlated the institutional spending (as the objective measure) with the established rankings of institutional quality, and in 1963, Pike conducted a study of Texas community colleges based on current expenditure, enrollment, and expenditure per student (Rathburn, 1982). In 1963, Jordan divided 119 colleges and universities into five strata according to the quality of their undergraduate education based on the library volumes per student and library staff salaries (measure associated with graduate schools). In 1964, the American Council on Education developed a six-level stratification of 767

liberal arts colleges which included all predominantly undergraduate four-year colleges and universities, although this classification was apparently never published. The "quality per student" criterion was used by Brown in 1965 (Webster, 1986b, p. 39). By this time, new criteria and indicators were being considered. Astin (1965b) listed the 25 highest-ranking colleges and universities by their "estimated selectivity," in 1961-1963.

One of the most notable studies of this type was the 1966 ranking of the doctoral programs (departments) by Allan Cartter. Besides ranking, Cartter's aim was to correct the flaws in studies conducted by Hughes and Keniston, the most important of which were lack of control for geographical bias and raters' biases toward their alma mater, failure to distinguish measures of faculty quality from measures of educational quality, and using the department chairpersons (Rathburn, 1982). Cartter's 1964 survey included 4,000 faculty members in 30 disciplines at 106 major institutions. Despite the apparent validity of the results of Cartter's study (high correlation with a number of measures such as faculty salaries, library resources, etc.), Cartter refused to produce institutional rankings by aggregating the departmental rankings. Magoun (1966), however, presented an aggregated indicator of the institutional ranking based on the data from Cartter's report by assigning additional scores to the descriptors (Magoun, 1966).

Parenthetically, similar studies to produce program/ institutional rankings were undertaken by Morgan, Kearney, and Regen, (1976), the National Science Foundation (1969); and Petrowski, Brown, and Duffy, (1973). Carpenter and Carpenter (1970), Cole and Lipton (1977), Cox and Catt (1977), Gregg and Sims (1972), Margulies and Blau (1973), and Munson and Nelson (1977) used the two ACE criteria, quality of graduate faculty and effectiveness of the doctoral program (Rathburn, 1982).

The most significant study after Cartter's 1966 report was done by Roose and Anderson (1970) for ACE. Though this report presented "raters' scores rather than absolute raw departmental scores and spoke in terms of quality ranges instead of specific institutional rankings . . . its results were very similar to Cartter's report" (Rathburn, 1982). Meanwhile, other studies followed.

Abram Samuel's 1965 pamphlet, "Where the Colleges Rank" and its successive issues (1967 and 1973) were "two of the most successful attempts to rank colleges and universities by the quality of their undergraduate education" although he considered them "more of a conversation piece than anything else" (Webster, 1986b, p. 40). In 1967, Brown conducted another study introducing eight criteria for ranking. A number of non-academic ratings began to appear in popular press, and even commercial and often unreliable versions of rankings were generated, among which the dubious Gourman's

Reports (form 1967 to 1989) should be mentioned that regardless of their lacking any logical or scientific foundation (Coughlin, 1978; Webster, 1984) have received wide acceptance, even in the academe.

During this period, other ranking criteria were also introduced. Lewis (1968) offered publication productivity; George Pierson (1969) published a ranking of almost 100 colleges and universities according to how many leaders, in a great many fields, they had graduated. Wispe (1969) used research productivity as the evaluation criterion; Krause and Krause (1970) evaluated students' success; and Walters (1970) presented 58 indicators for assessment of community colleges. Correlation of quantifiable measures to established ranking of institutional quality was also attempted. Astin (1977) suggested selectivity; Hagstorm (1971), and Elton and Rose (1972) proposed institutional size; and Drew (1975) included research productivity.

In 1978, Astin used the 1973 freshman scores on the Scholastic Aptitude Test (SAT) and the American College Test (ACT) to list the 25 most selective public and private institutions (Astin & Solmon, 1979). In 1981, Solmon and Astin ranked the leading departments in seven fields of biology, business (later excluded), chemistry, economics, English, history, and sociology at schools that had not been rated in the top category in these fields in the Roose/ Anderson reputational ranking (Solmon & Astin, 1981).

The staff of U.S. News and World Report have been involved in quality ranking since 1983 and although they have tried to improve and validate their methodologies, the results of their efforts, along with the other "popular press" ratings, have only received public attention. Even the 1989 version (Sheler, et al., 1989) with a seemingly scientific methodology and objective data has serious flaws. This study, besides assigning arbitrary weights and scores, bases the ranking on only five criteria of selectivity, reputation, faculty, resources, and retention. The authors omitted retention criterion from their 1990 ranking of "best" graduate schools, but the ranking, despite attempts for improved the methodology, still suffers from the same shortcomings as its predecessors (America's . . . 1990).

Critique of Ranking

Most of these evaluative studies have had wide acceptance and long-lasting effects on higher education (Solmon, 1981). Hughes studies, for example, evolved from a basic guide for undergraduates to "procedures for quality ratings including the identification of the nation's leading institutions" (Rathburn, 1982, p. 13), and parents have relied on popular press ratings to make decisions about the future of their children. Most of these reports, however, have suffered from a number of general and specific flaws.

First, only 15 out of several hundred studies (Webster, 1986b, p. 40) addressed the undergraduate education which

has been the largest segment of American higher education. Second, those that did, represented the quality of an institution or department with a number--aggregated or otherwise--and then committed the logical fallacy of comparing it with other units across the nation, whether or not they were comparable in terms of type, size, mission, etc. Third, regardless of the several different criteria and benchmarks that were employed, none of these studies considered the overall institutional system (all the input, processes, and output), thus, overlooking several major components and factors. Fourth, in these ratings, "results may be inextricably tied to the precedents set in previous reputational studies" (Solmon, 1981, p. 25). Fifth, peer review--rating by faculty as experts--has been the methodology used in most of these studies and has received most attention among academics, primarily because experts, by definition, have not been obligated to justify their selection. However, because their judgments have proven to be heavily influenced by only one factor, that is, their perceptions of the scholarly accomplishments of the faculty in that department (Astin & Solmon, 1981), using peer judgments has been "a focus of national controversy for some time" ("Cartter," 1977, p. 44). Other cited weaknesses have been listed as lack of an agreed-upon definition of quality (Lawrence & Green 1980); unscientific approaches that reward large, orthodox research institutions (Solmon, 1981);

failure to recognize diversity, innovation, and nontraditional models (Dolan, 1976) and raters' (e.g., alumni) bias. Astin (1985b) stated that other traditional concepts of "excellence" used in previous studies--reputational, resources, outcome, and content approaches--have not been effective and have suffered major drawbacks.

The literature reviewed in this study provided a list of criteria for evaluation and ranking of institutions of higher education that reflected the efforts for finding an acceptable and conclusive benchmark for measuring quality. Even if aggregated, these criteria would only address the system in parts, and even then, without factoring the interrelationship among them, they would not be able to produce a conclusive result. These criteria--a number of which were reported by Fotheringham (1978)--included

- faculty per capita article publication
- faculty reputation and quality of the educational experience
- faculty eminence through scholarship--especially at the graduate level
- number of prominent scholars
- the quality of facilities and staff of the doctoral program
- quality of doctoral programs and the faculty
- the quality of the graduate faculty
- total number of full-time faculty
- faculty-student ratio
- proportion of faculty with doctorate
- average faculty compensation
- research productivity
- faculty commitment to undergraduate teaching
- scholarly or professional accomplishments of faculty
- student/faculty ratios
- faculty satisfaction and achievement
- reputation and accessibility of faculty
- quality of students

- the quality of preparation of doctoral students
- estimated selectivity
- proportion of students entering graduate school
- proportion of graduate students
- students' success
- selectivity based on freshman SAT/ACT scores
- preparation of students for graduate/professional school
- preparation of students for employment after college
- institution's popularity among high ability students
- institution's popularity among out-of state students
- being the most often selected schools by all students
- total enrollment size
- percentage of graduate students
- value added approach (outcome)
- student satisfaction
- access and retention
- prominence of the alumni
- number of leaders graduated in any field
- alumni achievements
- library resources
- library holdings
- other educational facilities
- amount of money spent
- current expenditure and expenditure per student
- library volumes per student and library staff salaries
- total income per student
- number of library volumes per students
- resources (endowment, library budget, financial fitness)
- institutional size
- sheer institutional size
- financial resources
- per student expenditures for various purposes
- curricula
- innovative programs
- the effectiveness of the doctoral program
- the degree of expected change in departments
- overall quality of undergraduate program
- innovativeness of curriculum and pedagogy
- producing Ph.D.s
- total bachelor's degrees awarded in that field
- the percentage of baccalaureates awarded in various fields
- business/industry experts' views
- reputation among higher education expert
- the top institutions as rated by Gourman 1977

- reputation (a well-respected name)
- factors contributing to an effective and professional environment
- control (private vs. public, etc.)
- geographic region
- prestige (an interaction between size and selectivity)
- goals and goal achievement
- customized measures for different institutions
- administrator satisfaction and achievements
- services provided to local and broader communities
- innovativeness and leadership
- rates of improvement in different dimensions
- views given by multiple evaluators
- quality not quantity
- institution/program contributions to the student and community
- evolution/history

Accreditation

The accreditation process was among the early efforts to deal with the issue of educational quality control and even today, the most intensive quality measurement and control activities have been undertaken by accrediting agencies. Along with the local lay boards of education, accreditation has been one of the two unique features of the American educational machinery (Armstrong, 1962; Crippen, 1981; Selden, 1960). It is a non-governmental, voluntary means for regional, specialized, and other national accrediting agencies to set the characteristics, qualities, and manner in which those who seek and hold membership in the agencies are judged (Thrash, 1979, p. 116). Selden (1960) stated that higher education in modern society could function only with the aid of some organizational method that ensured the maintenance of academic quality (p. 86), referred to as quality assurance by Kendall (1983).

Accreditation has been defined conceptually, procedurally, and operationally and unlike quality, the definitions are similar (Bertrand, 1974; Orlans, 1975; Selden, 1956). The basic characteristics of accreditation, according to Selden (1956) are (a) its prevailing sense of voluntarism, (b) its strong tradition of self-regulation, (c) its reliance on evaluation techniques, and (d) its primary concern with quality. Historically and currently, accreditation at postsecondary level has been intended to foster excellence by developing criteria and guidelines for assessing educational effectiveness; encouraging improvement; ensuring appropriateness of institutional objectives; providing counsel and assistance; encouraging diversity; and protecting against encroachment (Young, 1979, p. 216).

The importance of accreditation and accrediting agencies is reflected in their history and growth. These practices were initiated by leaders in education in response to a need for articulation among institutions and quality control of the diverse educational organizations (Brubaker & Rudy, 1968, p. 389). By the early 1990s, associations of academic leaders were underway, from which the American pattern of accreditation evolved in 1906 (Stauffer, 1981, p. 1). The first accrediting activity occurred in 1910, and the first list of regionally accredited institutions was published by the North Central Association in 1913 (Crippen, 1981; Orlans, 1975; Selden, 1960).

Kells (1976) stated that the main purpose of the regional agencies should be twofold--to assist in improving institutions and "to indicate those that are known to be generally effective in achieving appropriate educational objectives" (p. 27). Today, six regional and more than 70 program accrediting agencies, as well as a number of state and federal agencies in the public sector (Crippen, 1981; Kaplin & Hunter, 1966) are directly and indirectly involved with identifying and determining academic quality and with advising institutions to maintain and enhance academic quality. Regional associations serve many purposes, but the public identifies them primarily with quality assurance function. Various higher education consumers rely on the judgments of regional accrediting associations to satisfy concerns about institutional quality (Troutt, 1979).

In fulfilling its role, accreditation focuses on two concerns: (a) educational quality, and (b) institutional integrity. Accreditation agencies have evaluated and encouraged educational quality by looking at input, resources, and process on one hand and the outcomes on the other (Young, 1983). Relative to accreditation, quality has generally been defined as "institutional effectiveness in achieving appropriate educational objectives" (Millard, 1986, p. 1); or "quality in education relates directly to the educational appropriateness of objectives and to the effective use of resources in achieving those objectives"

(COPA, 1986, p. 1). However, even here, the definitions of quality are vague, varied and inconclusive, although sharing a number of assumptions about quality (Troutt, 1979). These assumptions have been (a) judgments about institutional quality should rest on inferences from certain conditions rather than direct assessment of student performance; (b) no common benchmarks existed for assessing or defining institutional quality; and (c) current accreditation criteria equated higher education with a production process (p. 201).

The six regional accrediting agencies have operationally defined accreditation and quality through proposing standards and criteria that they contend will ensure quality, excellence, and effectiveness. These criteria are generally broad and non-specific, with their interpretation mostly delegated to institutions or members of visiting teams. The number of the criteria also varies. The Middle States Association (MSACS) has proposed fifteen standards which were described qualitatively, rather than quantitatively (MSACS, 1987, p. 3). The New England Association (NEASC) has suggested twelve "qualitative criteria for the measurement of institutional effectiveness" (NEASC, 1983, p. 7) including one on ethical practices.

The Northwestern Association (NWASC) has established eleven standards for evaluating quality, candidacy, and accreditation (NWASC, 1988, p. 3). The Western Association (WASC) asserted validity for its nine standards because they

were the results of extensive experience and research (WASC, 1988). Finally, the Southern Association (SACS) and the North Central Association (NCACS) have limited their standards to five basic and broad standards. Similar to NCACS (1989, p. 1), the SACS (1988) has maintained that the purpose of accreditation has been to improve educational quality; to assure the public that the institutions meet established standards (p. 7); and that these criteria assist the institution "to achieve overall effectiveness in all areas of its growth and ensure the quality of its educational programs" (p. 9). A comparison of the standards revealed that the six agencies concur on five of the standards, thus assigning more importance for them. These standards were (a) institutional mission and objectives & purpose, (b) educational programs, (c) library and learning resources, (d) financial resources, and (e) administration.

Accreditation has been both praised and condemned. While it has been credited with significant contributions to the enhancement of the educational quality and effectiveness (COPA, 1986, p. 1), it has also been the target of serious criticisms from its early days. Capen (1939) called the accreditation officials "a horde of irresponsible outsiders, each representing a separate selfish interest" (Young, 1983, p. 13). Pinkham (1952) described accreditation as an "elusive, nebulous, jellyfish term that means different things to the same people" (p. 47); Wriston (1960)

considered it a wasteful process based on superficial judgment which "seeks not only to compare apples with grapes, but both with camels and cods" (p. 320); and Kells (1976) stated that "accreditation" is so "misunderstood and so abused that it should be abandoned" (27).

Current criticisms, however, aim more at the inability of the accrediting agencies to define, assess, and improve quality. Trout (1979) contended that "available research cannot substantiate the claim that certain accrediting association criteria assure institutional quality" (208). Hefferlin (1974) charged that accreditation's evaluative criteria failed to relate in any way to the educational accomplishments of students, and Orlans (1975) maintained that regional accreditation has stopped, for the most part, making quality distinctions. Gollnick & Kunkel (1986) cited ambiguous standards, ignoring factors essential to the quality of programs, failure to apply standards consistently, bias against certain types of institutions resulting from uneven application of standards have often been cited as the concerns over accreditation evaluations.

Accreditation has at times been more concerned with process than product and has tended to evaluate institutions and programs more on the basis of resources than on how and for what purposes they are used. In professional areas, it has appeared to be more interested in professional status than in the quality of educational preparation for entry

into the field (COPA, 6). This application of an industrial model has also been cited as one of the reasons for criticism (Troutt, 1979). This implies, on the part of the accrediting body, a direct relationship between the quality of the assembly line and the quality of the product, leading to such actions as the AACSB's (American Assembly of Collegiate Schools of Business) refusal to grant accreditation to the University of Hartford based on insufficient number of faculty with Ph.D.s despite a 100% placement rate of the graduates (Sandholtz, 1989).

Reliance of the federal and state governments on accreditation for such issues as certification, licensure, funding, etc., has created the threat of governmental involvement in higher education and at the same time, has eroded its voluntary nature (O'Neill & Heaney, 1982, p. 57). Institutional support is also missing. In 1978, dissatisfaction with COPA was running so deep that there was talk of reviving the National Commission on Accrediting, because many college presidents felt that COPA simply was not protecting the institutions against specialized agencies (Jacobson, 1980, 1, 10). At the same time, COPA's efforts to improve the accreditation process were not supported by the higher education community (Saunders, 1978, 65).

Institutional self-study and peer evaluation have been basic to the process of accreditation (Young, 1979). The results of these analytical institutional or program self-

studies have contributed to sustaining and enhancing educational quality. "Such self-evaluation is an essential component in accreditation" (COPA, 1986, p. 5). Yet, similar to the accreditation criteria, this first and most important step has not had "a thorough empirical study" (Kells & Kirkwood, 1979, p. 25).

To eliminate such flaws, accreditation has constantly moved from quantitative measures to more qualitative standards and increased emphasis on peer judgment, and "from a primary emphasis on process and resources to increased concentration on results and learning outcomes" (COPA, 1986, p. 6). An over-emphasis on this new approach, however, has posed some potential dangers such as over-dependence on formulas, quantitative results, and the dangers of homogenizing; confusing assessment with testing and moving toward standardized testing (uniform tests indicate not quality but minimum expected attainment that can easily be confused with maximum expectations); replacing one type of quantification with another; confusing assessment of learning outcomes with the effectiveness of an institution as a whole; and overlooking the relevance of process and means to results or outcomes, because process and outcomes constitute a continuum (Millard, 1987).

General Systems Theory

The failure to take a total system approach to institutional evaluation is probably the main reason for the

failure of these evaluative attempts. "Institutional effectiveness is a function of how well it [the institution] accomplishes all of its objectives and its mission as a whole, not just one part--as important as that part may be" (Millard, 1987, p. 2). This notion is in accordance with the main postulate of the Attributive Theory of Quality that defines and measures quality of a phenomenon as the interactive sum of all the necessary and sufficient properties that comprise it, leading to the adoption of the general systems theory for the analysis of the phenomena and for model building. The systems theory, advanced by Bertalanffy (1968), "represents a holistic view of phenomena, a recognition that it is the nature of the relationships among parts rather than the nature of the parts themselves that makes each system unique" (Silver, 1983, p. 60). The general systems theory, according to Boulding (1968), "studies all thinkable relationships abstracted from any concrete situation or body of empirical knowledge" (p. 3). To further this notion, Johnson et al. (1976) indicated that the systems philosophy related "complex ideas, principles, and laws so that they become meaningful" (p. 63).

General systems theory is in accordance with the scientific or positivistic approach to knowledge production in that it aims at discovering "constancies or predictable patterns . . . [and] quantifiable factors in the relationships among parts" (Silver, 1983, p. 60). Application of

systems theory to social organizations and phenomena has been advocated. Starling (1975) maintained that systems concepts could simplify complicated social groupings and make them understandable. Johnson et al. (1976) further stated that the term systems connoted "plan, method, order, and arrangement . . .. a framework (or system of systems) that will ultimately tie all disciplines together into an understandable, cohesive whole" (p. 59).

Similar to the word quality, the term system has become "a common word in our vocabulary. Most people use the word as an everyday expression to describe what they do and how they live" (Johnson et al., 1976 p. 57). However, unlike quality, the concept of systems seems to be more uniformally and clearly understood (Flagle et al., 1960; Chorofas, 1965; Rapoport, 1968; Blendinger, 1969; Atwood, 1977; Johnson and et al., 1976). Overall, a system has been defined as

> a set of objects together with relationships between the objects and between their attributes. Our definition does imply of course that a system has properties, functions or purposes distinct from its constituent objects, relationships and attributes. (Hall & Fagen, 1968, p. 81)

As common threads in the definitions of system, Kimbrough & Nunnery (1983) cited the concepts of interdependence, interrelation, and relationships. Blendinger (1969) stated that the focus on whole, parts, and the relationships among the parts "provide an opportunity for logical linkage among many conceptualizations of a non-global nature" (p. 319), and further listed four essential criteria for a

system, (a) a structure or organization, (b) the structure or organization conceptualized as an orderly whole, (c) relation of parts to each other, and (d) the relation of the parts to the whole. Riley & Riley (1959) stated that interdependency in a model of a social system suggested that introducing any form of change into a system would impact the whole system until it reached a state of equilibrium; a concept of utmost importance to higher education.

Systems Analysis

Closely related to systems theory--for the purposes of model-building and problem-solving--is the concept of systems analysis, which along with design, is central to the systems approach (Blendinger, 1969). A system may be broken down "for the purpose of analysis into clusters or subsystems of relative interaction and heightened interdependence" (Brewer, 1975, p. 180). Blendinger (1969) stated that "analysis involves the reduction of complex entities into their component segments so that each segment can be studied" (p. 50). The level of analysis (breakdown) should, however, be predetermined, albeit, arbitrarily, because the process of breaking down components can be carried on to undefined number of levels.

Model Building

In contemporary science, the word model covers several concepts and ideas. D'Espagnat (1983) believed that scientific views must be expressed in simple and pictorial

ways to the relatively indifferent public "to quickly construct an approximate idea about the nature of things, an idea which is rough but is nevertheless preferable to no idea at all" (p. 107). Such simple models are implicitly presented as being faithful descriptions of independent reality. One meaning of model, according to d'Espagnat (1983) is a simplification that the mind performs on the real facts which are considered to be highly complex and hardly manageable, e.g., "reduced model" in technology. The word model is also used in relation to theories that do claim to describe reality itself but whose validity in this respect can neither be proven nor refuted for lack of the means of verification. In any case, it should be noted that a model should not be interpreted as a total and intelligible description of reality as is.

Dilworth (1986) stated that scientists build idealized models based on their knowledge to understand the reality underlying laws of science, and added that such a model represented a phenomenon as it related to scientific laws when the aspect of reality which was responsible for it was not open to direct inspection. It is appropriate here to again point out that, unlike a theory, a model, as soon as it has been acknowledged as such, is not discredited by some false consequence of it, but that, quite the opposite, it often remains useful in its own domain long after such an imperfection has been discovered (d'Espagnat, 1983, p. 112).

Subjectivity, Objectivity and Intersubjectivity

Subjectivity and objectivity, in both perception and measurement, were recurrent themes in the reviewed literature. A significant part of the available corpus encompassed an ongoing debate between the proponents of objectivity and subjectivity, or more accurately those assigning a higher validity to one approach over the other. Recent literature, however, reflected the belief that to many the two concepts were the "two sides of the same coin" (Dallmayr, 1981, p. ix), and rather than one being the antithesis of the other, a degree of each is present in the outcome of all evaluations and decisions. In this vain, the intersubjective approach has been advanced as the method of perception and measurement of such concepts as quality.

Objectivism has been defined as "the doctrine that things or qualities or values exist in their own right independently of the knower and of the conditions of knowledge" (Honer & Hunt, 1978, p. 246). Deutscher (1983) considered objectivity as "a characteristic of one's approach to or attitude to things" (p. 136). Kupperman (1978) asserted that an idealized truth existed for any reality, and this truth formed the basis for the claim that, "there is a single optimal account or description of any set of events or states of affairs" (p. 150).

Objectivity, commonly held up as an ideal, is considered as an "intellectual, moral, emotional, and

sensual virtue, [and] is the capacity and preparedness to draw one's ideas and attitudes, and to gain one's emotions and feelings from their own objects" (Deutscher, 1983, p. 40). Objectivity is valued because it is perceived to result in impartiality of evaluation, correctness of opinions, fairness of judgments, control of emotions and feelings, and reliability of measurements. It is also associated with validity in science and scientific work.

Emphasis on objectivity, particularly through the use of statistical methods, gained strength in the early decades of the twentieth century and dominated evaluation and measurement in education and other social sciences in particular. This perceived dominance, however, has been seriously questioned during the past two decades (Orlans, 1973). Deutscher (1983) dismissed objectivity as "a vain search for an idealistic impossibility" and removal from the stage of "real life" (p. 42). Poole (1972) referred to it as a tautology or "the repetition of a statement as its own reason" (p. 44).

Kupperman (1978) reported that earlier in this century, a number of philosophers denied the objectivity of ethics. Later the objectivity of history and social sciences, and even the physical sciences were challenged, "mainly on the grounds that theoretical assumptions interact with scientific data in such a way that it becomes implausible to speak of an objective collection of scientific data" (p. 150).

On the other hand, subjectivity, commonly construed as the opposite of objectivity, has received more attention in the recent decades. Honer and Hunt (1978) defined subjectivism as "the doctrine that all things that exist, exist only as the knowing and experiencing of conscious beings" (p. 246). Wheelwright (1960) maintained that subjectivism opposed positivism by denying that the world described by science really existed. However, subjectivism, despite its apparently convincing arguments, opposes man's inherent and relatively strong belief in the existence of "external world independent of anyone's sensing of knowing it" (Wheelwright, 1960 p. 125). In this context, the term subjectivity has been used pejoratively to imply the subjects' immersion in their own sensations rather than responding to the objects of those, and to associate individuals with idiosyncrasy. Brightman (1945), while partially accepting the subjectivists' view that many evaluations were subjective, maintained that it was not possible to prove that all values or opinions were subjective, and that it was difficult to distinguish between the subjective and objective. His belief in objective standards, even if partially known, was so strong that he asserted without them "reason will collapse" (p. 160). The proponents of subjectivity, however, have maintained that arguments against subjectivism drawn from the so-called "real world" cannot refute or weaken its logic.

To resolve the dispute over the validity of either the objective or subjective approach in portraying reality, philosophers of science have reverted to the intersubjective approach. Intersubjective has been defined as "used and understood by, or valid for different subjects. Especially, language, concepts, knowledge, confirmability" (Runes, 1984). According to Feyerabend (1981), Aristotle considered knowledge as "a complex social product that influences every generation, may even dominate it, but which is also changed and improved by collaboration of many generations" (p. 183).

Titus (1964) defined subjectivism, or more technically epistemological idealism, as the belief that the "objects and qualities do not exist independently of a consciousness of them" (p. 44). On the other hand, objectivism, or epistemological realism, asserted that an independent reality exists apart from minds. Between the two, Titus placed phenomenalism or epistemological dualism, whose followers contend that people can only know phenomena and not the ultimate reality, and that the external world, as perceived by subjects, is not necessarily the same as or even similar to the external world that stimulates their senses. Convergence of subjective views, however, can result in a realistic understanding of the world.

Dallmayr (1981) considered intersubjectivity as a "handy launching-pad for excursion into less familiar terrain" (p. 39). Nagel (1986) assumed a close connection

between objectivity and intersubjectivity, and rejected the appropriateness of pure objectivity for explaining the phenomena. Brown (1977) contended that the evaluation and acceptance of scientific proposals as a part of science by the community of qualified scientists required that the objective theories be intersubjectively testable.

Feigl (1953) contended that the term intersubjective reflected the social nature of the scientific enterprise and considered intersubjective testability more adequate than the general concept of objectivity for formulation of science. Finally, d'Espagnat (1983) defined intersubjectivity in the context of weak objectivity, reached when a statement or concept was invariably valid for any observer and differing from subjectivity through this invariance, maintaining that "even a die-hard realist could not deny that weak objectivity is sufficient for development of science, at least so long as it refrains from any claim of describing what lies beyond human experience" (p. 58).

The public's focus on high quality products is intensifying. Therefore, dealing with quality and quality-measurement issues will continue as one of main and critical tasks of higher education in the coming decade. The need for a systematic and realistic approach to defining and measuring quality is more acute now than ever before.

CHAPTER IV
RESEARCH METHODOLOGY

> Mind cannot form any notion of quantity or quality without forming a precise notion of degrees of each.
> (Hume, 1975, p. 393)

> But then Number is the Idea of Things.
> (d'Espagnat, 1983, p. 51)

Introduction

The primary purpose of this study was to advance the Attributive Theory of Quality as the basis for defining and measuring quality, especially as it related to the higher education institutions. Then, to illustrate how the proposed theory could be operationalized, a model based on the general system theory was developed on Lotus 1-2-3 spreadsheet to perform the calculations. Subsequent to a simulated run, the model was tested with illustrative data collected from five community college libraries, and the results were verified against a set of similar data acquired from a panel of SACS experts. Three types of data used to conduct a model illustration were (a) the components and subsystems of one type of higher education institution (Carnegie, 1987), (b) the weight of each component and subsystem within the system, and (c) the value of each component.

Obviously, since the Attributive Theory of Quality is presented for the first time in this study, the criteria and methodology for defining and determining weights and values in the context of this theory do not exist, and establishing them necessitates several studies that exceed beyond this study. Similarly, based on the analysis of the available literature, a systems approach to institutional evaluation has not yet been adopted, and as a result, a comprehensive systems analysis for identifying the components and subsystems of a higher education institution has not been conducted. This, too, entails several major studies and is, therefore, beyond the scope of this study.

To proceed with the illustration, the components and subsystems of one unit of a higher education institutions, namely the library, was adopted. The breakdown of this unit into components and subsystems--although neither conclusive nor uniform--has been outlined by the Southern Association of Colleges and Schools (SACS) for accreditation purposes. It should be noted that (a) replicating this methodology to encompass the total institution will only extend the illustration; actual measurement is possible only after the required data have been acquired through the research activities outlined in the previous paragraph, and (b) other measurement models might be developed to perform the calculations within the parameters of the Attributive Theory of Quality and the general systems theory.

With the underlying theory established, an illustration of the operationalized theory needed to be undertaken. For this purpose, the study was divided into two stages. The first stage had five phases, (a) development of the model, (b) development of the data collection instrument, (c) site visits and data collection, (d) calculation and tabulation of the values and weights, and (e) testing the model with the acquired data. Stage two included (a) collection of data from the SACS expert panel and tabulation of the data, (b) comparison of the results of the model with the outcomes of the panel's views, and (c) analysis of the findings.

Research Perspective

The Attributive Theory of Quality is a descriptive theory of the classification type--explaining the structural interrelationship of the dimensions or characteristics of a phenomenon--and as such requires a descriptive (explanatory) research approach (Fawcett & Downs, 1986, p. 4). This type of research is directed toward answering questions such as "What is this?" (Diers, 1979, p. 103), and "What are the existing characteristics of the real world relative to the specific question?" (Payton, 1979, p. 44). The study was designed to illustrate the process through which a group of evaluators of an institution would assign weights and values to the components and the subsystems, and how these weights and values interact to produce numeric values as the indicators of institutional quality.

Research Population

The study populations consisted of five community college libraries in Florida. Florida's network of 28 community colleges are providers of essential academic, vocational, and life-long training and education to all sectors of the population, and as such, are an integral part of the state's higher education system.

Selection of Samples

Five Florida community college libraries, vis-a-vis other types of institutions, were selected for this study, because Florida community colleges, being identical in many aspects, could show that the variations in the quality indicators were institution-specific and were not the caused by factors such as the type or mission of the institutions. The full-time librarians were selected for interviews.

Selection of the Panel

A panel composed of 5 community college librarians with experience in accreditation reviews of community college libraries was deemed sufficient for verifying the findings of this study, that is, to ascertain if the global evaluation of a group of experts would be similar to the results generated by the model. This panel was recommended by the Souther Association of Colleges and Schools.

Instrument

The instrument is an interview guide developed by the researcher, and was based on the breakdown of the

institutions of higher education into their hierarchical subsystems and components as delineated by the Commission on Colleges of the Southern Association of Colleges and Schools (SACS) for accreditation purposes.

Data Collection

The required data were collected through interviews with the librarians of selected community colleges in Florida, using the interview guide that required the librarians to assign weights to all the component and subsystem clusters, and values to the components only. Simultaneously, a panel of experts were identified for providing the required data for validation. The panel members were asked to provide a numeric value from 0.0 to 100 for each of the five libraries based on the profiles provided by the researcher and developed from the data provided by the head librarians at each institution.

The Illustration Model

The model, constructed on the Lotus 1-2-3 spreadsheet, was designed to calculate the numeric indicator of the quality of the library only; however, the other main structural subsystems that form the total institutional system were also included to show the effect of the quality indicators of the libraries on the total institutions.

Calculation of the Data

The arithmetic means of the weights and values assigned to the components and subsystems were accepted as the

intersubjective consensus of the subjects. The weights were averaged first within and between institutions to yield a set of weights (considered constants) that were universal to community college libraries. The values were averaged within each institution only, and constituted the variables.

To calculate the interactive sum of the weights and values in the proposed model, the formula

S = ValA * WghtA + ValB * WghtB + . . . + ValN * WghtN

was adopted. This formula is, in essence, a linear equation used to depict the relationship between the objects and attributes (value and weights) in a system (Hall & Fagen, 1968). A system of linear equations formed the formula base for the proposed model. The arithmetic means of the weights and values were entered into the model which calculated the interactive sum of each set of subsystems at each level of the hierarchy (one linear equation) and assigned it to its respective subsystem at the next level until the sum of all the library subsystems was calculated and assigned to it. This sum indicated the perceived quality of the library at each community college.

CHAPTER V
DATA ANALYSIS AND FINDINGS

In search of a solid theoretical basis and a conclusive definition for quality, an intensive literature search on quality and quality measurement was undertaken. The result was that neither a sound theory nor a valid definition for quality, particularly in relation to higher education programs, existed. Hence, as its primary objective, this study undertook to develop a valid theory and formulate a practical definition for quality and quality measurement.

The Attributive Theory of Quality and the ensuing definition describing quality as the interactive sum of all the necessary and sufficient properties of a phenomenon, were proposed by the author and subsequently evaluated. The theory and the definition clarified the direction for construction of an illustrative measurement model. The "interactive sum of all the . . . properties" implied a systems approach to calculation and a model based on a system of linear equations was created on Lotus 1-2-3 spreadsheet.

Subsequent to a simulated run, the model was tested and the reliability of its results was verified with the data collected from five community college libraries. At the same time, the evaluative views of a five-member panel of

TABLE 1
LIBRARY AND INSTITUTIONAL VALUES AND
INSTITUTIONAL RANKING AS CALCULATED BY THE ATQ MODEL

RESULTS / INSTITUTION	LIBRARY VALUE CALCULATED BY THE MODEL	INSTITUTIONAL VALUE (BY THE MODEL)	RANK
Institution A	76.38	96.57	1
Institution B	65.94	95.32	4
Institution C	67.53	95.54	2
Institution D	67.26	95.50	3
Institution E	64.33	95.10	5

TABLE 2
COMPARISON OF THE RESULTS FROM THE ATQ MODEL
AND THE SACS PANEL OF EXPERTS

RESULTS / INSTITUTION	LIBRARY VALUE (MODEL)	LIBRARY VALUE (SACS)	RANK BY (MODEL)	RANK BY (SACS)
Institution A	76.38	80.60	1	1
Institution B	65.94	66.00	4	4
Institution C	67.53	73.00	2	2
Institution D	67.26	72.80	3	3
Institution E	64.33	61.2	5	5

accreditation experts were solicited to provide the data for further verification.

To represent the intersubjective concurrence of the experts, the mean weights of the components and subsystems and the mean values of the components of each library were calculated. Table 1 shows the results of the calculations by the model, namely, the quality indicators of the five libraries and their rank order, in addition to their effect on their respective institutions. Table 2 presents the comparison of the results of the calculations by the model with the numeric indicators of quality assigned to each library by each of the members of the panel of expert along with their rank order for verification purposes. The analysis of the data in Table 2 indicates that both sets of data validate the theory and verify the results of the model.

CHAPTER VI
CONCLUSIONS AND RECOMMENDATIONS

Through theory development, the purpose of this study was to clarify the prevailing misconceptions and confusions over quality in general, and educational quality in particular. An historical review and analysis of the literature demonstrated the absence of systematic and scientific approach in the research and study of quality. Over-reliance on inadequate evaluative criteria, mostly based on inaccurate definitions of quality, has also led to an abundance of inconclusive and misleading reports in this important area of American higher education.

As evident from the study, the Attributive Theory of Quality presents a realistic and comprehensive approach to definition and measurement of quality. The interactive nature of the theory utilizes a systems methodology, and the proposed illustrative measurement model can produce accurate and concrete results. An intersubjective approach to data collection and analysis requiring participation by experts is recommended. In this approach, experts are asked to provide the required data for analysis. The illustrative measurement of quality of 5 community college libraries in this study, revealed that this approach produces highly

reliable data.

The philosophical orientation and practical approach of this study have serious implications for the various sectors of higher educational system. Some of these implications have a higher degree of urgency and require immediate attention:

1. The proposed model, when fully developed, should be used in institutional evaluation processes, specifically accreditation, to arrive at accurate and comprehensive results, or at the very least confirm and validate the outcomes of other evaluation methodologies.
2. Current information on the type, parts and relationships of the parts of higher education institutions is inadequate. Efforts to develop a comprehensive database to secure such data are essential.
3. Rankings, if done at all, should be done only on institutions of the same type and mission.
4. A "total systems" approach to evaluation of educational institutions should be adopted.
5. Well-defined and relevant criteria as well as the parameters for measuring the weights and values of components and subsystems of educational institutions should be developed.

Recommendations for Further Research

Based on the aforementioned recommendations, the following studies are suggested:

1. Studies to determine the characteristics of the different types of higher education institutions in America should be undertaken so that a realistic and comprehensive classification of these institutions would be available.
2. System analysis to identify the subsystems and components of the different types of institutions must be conducted.
3. Studies to define the nature, establish the parameter, and determine the accepted weights of the subsystems and components in different types of institutions are necessary.
5. Studies to determine the value parameters (0.0 and 100) of each of the components of the higher education institutions are needed.

Limitations of the Study

There are several limitations in this study that should be noted. First, although the theory was formulated to encompass a complete system, e.g., a total institution, the model was applied only to one segment of the institution, the library, because the purpose of the model was illustration, and application of the model to a total institution will require several major independent studies.

To elaborate, the study has been limited to illustrating the process of applying the Attributive Theory of Quality to quality measurement in institutions of higher education by applying it one segment of the institution, namely, the library. Specifically, the study, the methodology, the instrumentation, and the measurement model have been designed based on the parameters and the data pertaining to the library. The measurement model, in particular, is a prototype that merely demonstrates the data calculation process as related to the library, and should not be construed as a product with general applicability.

Also, this study was not designed to test the parsimony and the internal consistency of the model. Testing these aspects of the Attributive Theory of Quality is only possible with the data obtained from studies recommended in this chapter. Finally, data analysis did not encompass any assessment of the interreliability of the ratings provided by the participants in the study, that is, the members of the expert panel and the professional staff of the libraries.

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